

Date: Wednesday, 08/04/2009 9:14:41 AM
 User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services Drawing Name: 350/355 AS X-TUBE FWD
 Job Number: 47079
 Estimate Number: 12485
 P.O. Number:
 This Issue: 08/04/2009 S.O. No.:
 Prsht Rev.: NC
 First Issue: / / Type: CROSSTUBES
 Previous Run: 47078
 Part Number: D350748101
 Drawing Number: N/A
 Project Number: N/A
 Drawing Revision: D
 Material:
 Due Date: 24/04/2009 Qty: 1 Um: Each
 Written By:
 Checked & Approved By: JD 09.04.08
 Comment:
 Est Rev:A New Issue 06-07-05 JLM
 Est Rev:B Update qty of MS21042L5 06-09-12 KJ
 Est Rev:C Rev B 07-11-15 DD
 Est Rev D Combined manufacturing 08.04.02 EC verified by:
 DD
 Est Rev:E 08-06-24 revD as per dwg DD verified by:EC

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description:

1.0 DC DOCUMENT CONTROL



Comment: Photocopy bluefile & type labels per PPPD350-748-101 CHG001



2.0 D350748141TRN Crosstube Turning Detail



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)
 CROSSTUBE TURNING DETAIL
 batch B44937



3.0 BENDING BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE
 Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT



4.0 QC15 DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES



5.0 CROSSTUBES CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1



1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
 Set-up drill table as per QSI 010

2-Deburr.

} 85 09-05-05

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: D Date: 09/06/11
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR: <u>47079</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>09.05.11</u>	<u>3</u>	<u>Tube bent high.</u>	<u>CP</u> <u>09.05.11</u> <u>pr</u> <u>05/10/12</u>	<u>Acceptable.</u> <u>Cut @ 23.37" high</u>	<u>NB</u> <u>09-05-06</u> <u>S</u> <u>09/05/06</u>		<u>CP</u> <u>09.05.11</u> <u>pr</u> <u>05/10/12</u>	<u>S</u> <u>09/05/06</u>

NOTE: Date & initial all entries

Date: Wednesday, 08/04/2009 9:14:42 AM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 47079

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Engrave Part # and Batch # as per Dwg D350-748-141

85 09-05-05

4-Remove all marks from tube within limits of D350-748-141

11 9-55

5- Apply a light coat of LPS3 on the interior of tube

Batch:

12109956 - ANM 9-5-6

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CHECK 10 DEG HOLES WITH DT8876E(EUROCOPTER CLAMP)

8-9/05/06 (10)

7.0

OUTSIDE SERV.11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O:

8753

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

C 209/05/07 (1)

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

P 9/4/2 (1)

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

10.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Prime Outside of Tube as per Dart QSI 005 4.2

85 09-06-04

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 47079

Part Number: D350748101

Job Number:



Seq. #:	Machine Or Operation:	Description :
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11.0	QC14	INSPECT SPRAY PAINT
------	------	---------------------



Joseph ①



Comment: Inspect Spray Paint
Then, Wrap in plastic bag to protect from scratches

12.0	D35021	Support
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Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

SUPPORT

Batch: 41603

RT 09-06-08

13.0	D2856400	Abrasion Strip
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Comment: Qty.: 1.2401 f(s)/Unit Total : 1.2401 f(s)

Abrasion Strip 7.10" long x2

Batch: 42437

RT 09-06-08

14.0	ALS41032225	Insert
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Insert

Batch: 107441

RT 09-06-08

15.0	AN960JD10	Washer
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Washer

Batch: 105442

RT 09-06-08

16.0	MS2192020	Clamp (per MIL-DTL-8783C)
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Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Clamp (per MIL-DTL-8783C)

Batch: 110451

RT 09-06-08

17.0	MS27039110	Screw
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Screw

Batch: 111425

RT 09-06-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 47079

Part Number: D350748101

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

18.0	CROSSTUBES	CROSSTUBES RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035.

3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

} 25 09-06-06

19.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

5 07/06/08 (X)

20.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1
Pick Packing Kit

21.0	D35001	Saddle
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Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
350 SADDLE
Batch: 45340

88 09/06/09 (X)

22.0	D35011	Bushing
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Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)
BUSHING
Batch: B14637

88 09/06/09 (X)

23.0	AN46A	Bolt
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Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)
Bolt
Batch: M110399

88 09/06/09 (X)

24.0	AN441A	bolt
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Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)
bolt
Batch: M110363

88 09/06/09 (X)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 47079

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M110363

SS 09/06/09 (K)

26.0

AN960JD416

Washer



Comment: Qty.: 32.0000 Each(s)/Unit Total : 32.0000 Each(s)

Washer

Batch: M111279

SS 09/06/09 (K)

27.0

AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Washer

Batch: M111279

SS 09/06/09 (K)

28.0

MS21042L4

Nut



Comment: Qty.: 24.0000 Each(s)/Unit Total : 24.0000 Each(s)

Nut

Batch: M110507

SS 09/06/09 (K)

29.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Nut

Batch: M111127

SS 09/06/09 (K)

30.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

SS 09/06/09 (K)

31.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D350-748-101

Location: B

PPP Rev: 12/8/09

12/8/09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Job Number: 47079

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

QC21

FINAL INSPECTION/W/O RELEASE



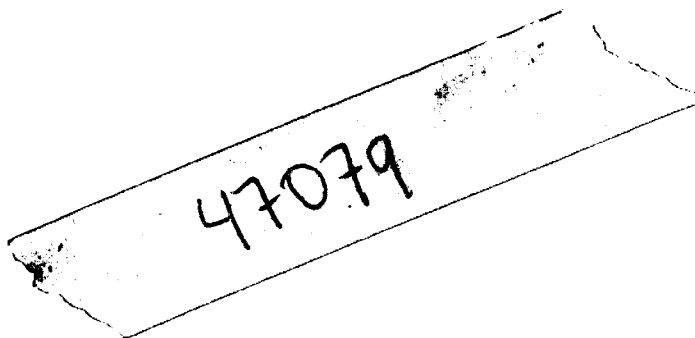
09/06/11
mf

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



mf
09-06-11



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

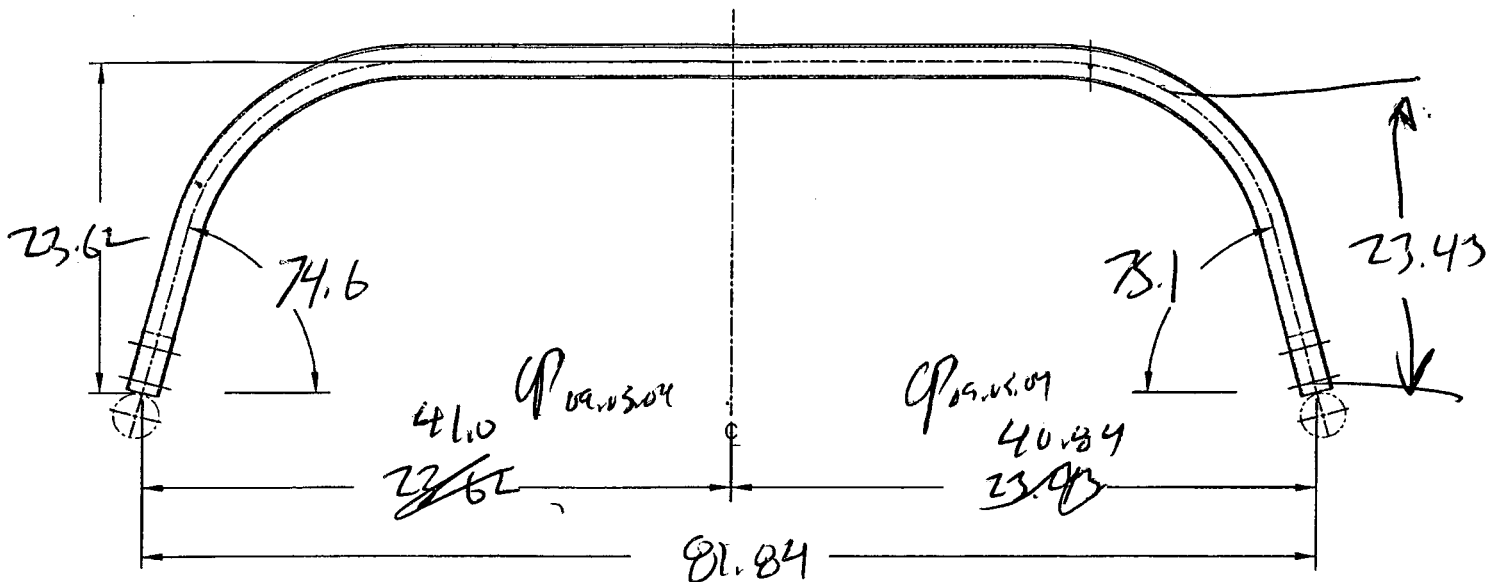
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	47079
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Tube bent high. Acceptable. Cut @ 23.37
Twist deflection = 0.274 P 09.05.04

QC15 Inspection	P 09.05.04
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART

RELEASED

06.10.31

DESIGN 92	DRAWN BY 92	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED H	APPROVED H	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

D350-748-141 CROSSTUBE:

- MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS ARE IN INCHES
- PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW

09.02.05

PER PCR #09.001

SHOP COPY

RETURN TO

ENGINEERING

UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

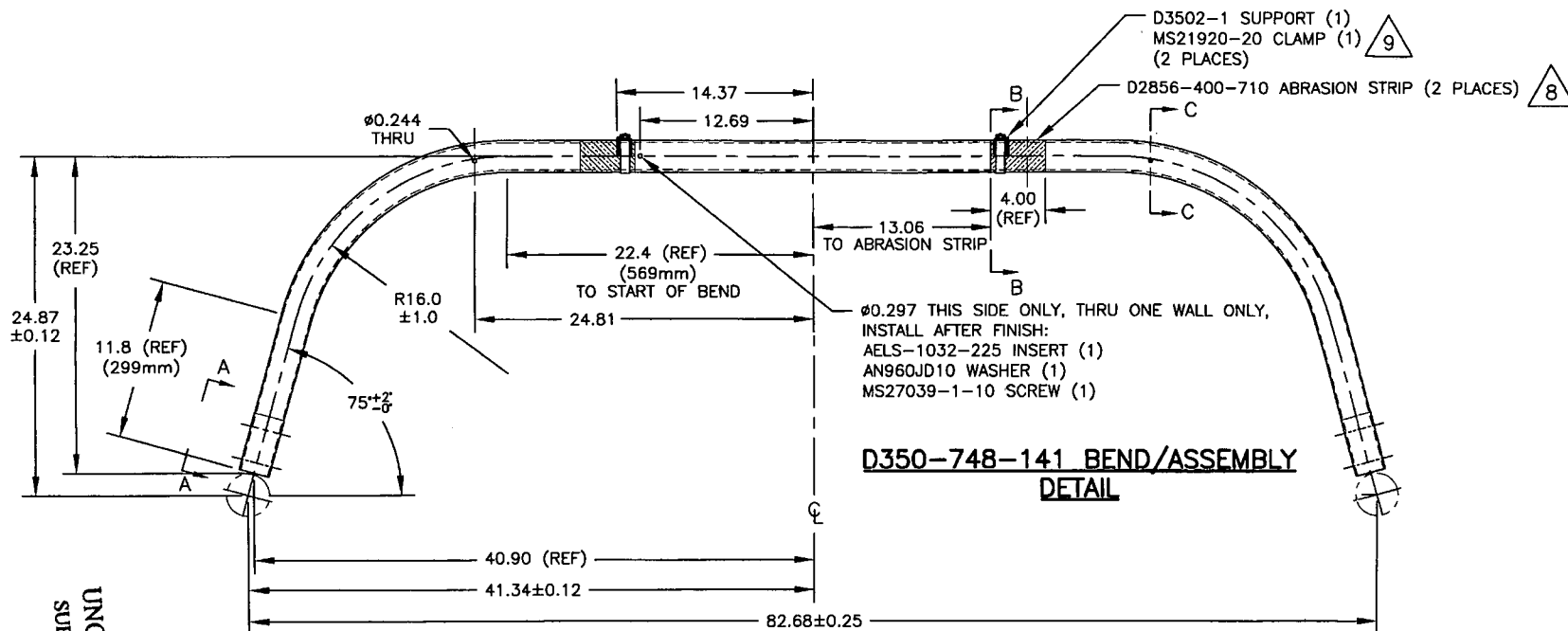
NO. 47029

UNDER REVIEW

OK 07.10.22

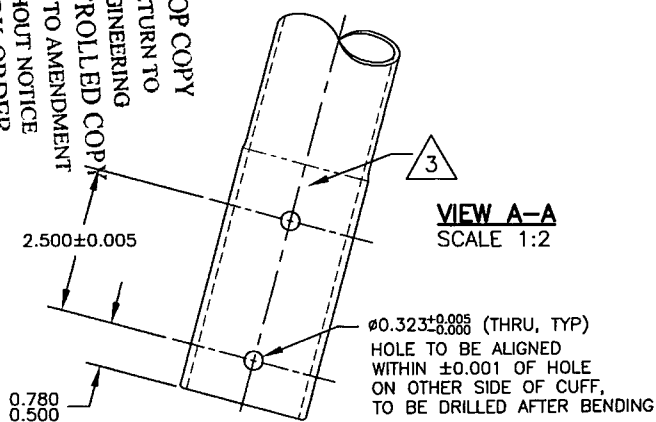
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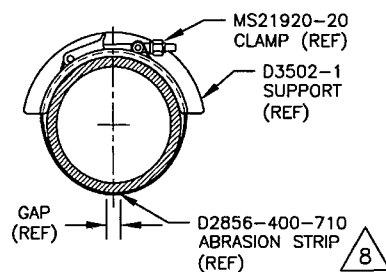
D350-748-141 BEND/ASSEMBLY DETAIL

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WITHOUT NOTICE
NO. 47029



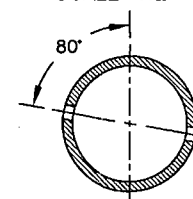
SECTION B-B

SCALE 1:2



SECTION C-C

SCALE 1:2



UNDER REVIEW

09.02.05

UNDER REVIEW

09.10.22

RELEASED

06.10.31

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DESIGN	40	DRAWN BY	40	DART	DART AEROSPACE LTD. WARRICKS, ONTARIO, CANADA
CHECKED	40	APPROVED	40	DRAWING NO.	REV. 0
				D350-748-141	SHEET 2 OF 3
DATE	06.10.31	TITLE		CROSSTUBE (AS 350/355 HI FWD)	SCALE
					1:8

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: May-29-2009

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 86478

INVOICE #: 44584

**CONTRACT OR
PURCHASE ORDER #**

PO00008753

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101 ✓

S/N # B47079

**STRESS RELIEF BAKE @ 375 FOR 5 HRS HEAT CHART #10447. MPI
INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW AMS-QQ-P-
416B, TYPE 2 YELLOW, CLASS 2. BAKE HEAT CHART #10508.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A large, stylized handwritten signature in black ink.